

The Use and Abuse of Shear Rates in Mixing

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Abstract

The terms “high shear”, “low shear”, “high efficiency”, etc. are frequently used to describe mixing systems and equipment, but these terms are usually applied with very little or no formal description or definition, and consequently there is rarely any quantification of the relevant values for comparison between equipment or operating conditions.

The aim of this poster is to:

- Summarise a range of methods to calculate/quantify a range of shear rates relating to different length-scales and operating parameters
- To discuss the relevance (or otherwise) of these shear rates (and, where relevant, corresponding shear stresses) with respect to a number of different mixing processes, in order to encourage engineers to apply them appropriately.
- To discuss a range of methods of defining “mixer efficiency”, and to highlight the implications of these in terms of mixer design and selection
- Relevant examples relating to Newtonian and Non-Newtonian fluids as well as multiphase (solid-liquid and immiscible liquid-liquid systems) will be presented

The overall goal of the poster is to help make those unfamiliar with the details of the “proper” definitions and implications of these terms consider them more thoroughly.

This poster will not contain any new research results (though some “new” data will be used to illustrate the examples”, but will rather focus on ensuring that old or existing knowledge is not lost, forgotten, or not considered.